IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Daniel T. Colbert et al.	§	Serial No: unassigned (division of application Serial No. 10/000,746)
For: METHOD FOR FORMING AN ARRAY OF SINGLE-WALL CARBON NANOTUBES AND COMPOSITIONS THEREOF	§	Filed: concurrently herewith
	§	Group Art Unit: 2881 (anticipated)
Atty Dkt: 11321-P011C1D3	§	Prior Examiner: Jack I. Berman 703.308.4849

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PRELIMINARY AMENDMENT ACCOMPANYING REQUEST FOR FILING DIVISIONAL APPLICATION UNDER 37 C.F.R. § 1.53(b)

Sir:

This paper accompanies a Request for Filing Divisional Application Under 37 C.F.R. § 1.53(b) and associated filing fee therefor ("the Request"). If the fee payment is missing or insufficient in amount, or if any other fees are determined to be due, the Assistant Commissioner, Commissioner, and/or the Director of the U.S. Patent & Trademark Office is/are hereby authorized to charge any such fees (or credit any overpayment) to Winstead Sechrest & Minick Deposit Account No. 23-2426, referencing matter number 11321-P011C1D3.

AMENDMENTS

In the Title

Please amend the title by replacing the present title with the following:

--METHOD FOR FORMING AN ARRAY OF SINGLE-WALL CARBON NANOTUBES AND COMPOSITIONS THEREOF--

In the Abstract

Please amend the abstract by replacing the present abstract with the following:

--This invention relates generally to forming an array of single-wall carbon nanotubes (SWNT) and compositions thereof. In one embodiment, a homogeneous population of SWNT molecules is used to produce a substantially two-dimensional array made up of single-walled nanotubes aggregated in substantially parallel orientation to form a monolayer extending in directions substantially perpendicular to the orientation of the individual nanotubes. Using SWNT molecules of the same type and structure provides a homogeneous array. By using different SWNT molecules, either a random or ordered heterogeneous structure can be produced by employing successive reactions after removal of previously masked areas of a substrate. In one embodiment, SWNT molecules may be linked to a substrate through a linker moiety such as -S-, -S-$(CH_2)_n$,-NH-, $SiO_3(CH_2)_3NH$- or the like.--

In the Specification

Please amend the specification as noted on page 4, paragraph 11 of the Request by inserting before the first line of the specification the following:

--RELATED APPLICATIONS

This application is a division of co-pending prior application Serial No. 10/000,746, filed on November 30, 2001, which is a continuation of prior application Serial No. 09/242,040 filed on September 13, 1999, which is the 35 U.S.C. § 371 national application of International Application Number PCT/US97/13896 filed on August 8, 1997, which designated the United States, claiming priority to provisional U.S. patent application Serial Number 60/023,732 filed on August 8, 1996. Each of the foregoing applications is commonly assigned to the assignee of the present invention and is hereby incorporated herein by reference in its entirety.

This application discloses subject matter related to the subject matter of U.S. patent application Serial Number 09/380,545, filed on September 3, 1999 in the name of Richard E. Smalley et al., entitled "Carbon Fibers Formed From Single-Wall Carbon Nanotubes," which application is commonly assigned to the assignee of the present invention and hereby incorporated herein by reference in its entirety.--

In the Claims

Please amend the claims as follows.

Please cancel claims 1-83 without prejudice or disclaimer to the subject matter thereof.

Please add the following new claims 84-140:

84. (new) A method for forming an array of single-wall carbon nanotubes comprising:

a) providing a plurality of single-wall carbon nanotubes; and

b) assembling the single-wall carbon nanotubes into a substantially two-dimensional array comprising single-wall carbon nanotubes aggregated in substantially parallel orientation.

85. (new) The method of claim 84 wherein the plurality comprises a group of single-wall carbon nanotubes having a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof.

86. (new) The method of claim 84 wherein the two-dimensional array forms a monolayer extending in a direction substantially perpendicular to the orientation of the single-wall carbon nanotubes.

87. (new) The method of claim 85 wherein the two-dimensional array forms a monolayer extending in directions substantially perpendicular to the orientation of the single-wall carbon nanotubes.

88. (new) The method of claim 84 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

89. (new) The method of claim 85 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

90. (new) The method of claim 86 wherein the two-dimensional array comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

91. (new) The method of claim 87 wherein the two-dimensional array comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

92. (new) The method of claim 84 wherein the plurality of single-wall carbon nanotubes comprises derivatized single-wall carbon nanotubes having at least one substituent bonded to at least end of the single-wall carbon nanotubes.

93. (new) The method of claim 84 wherein the plurality of single-wall carbon nanotubes comprises endohedrally modified single-wall carbon nanotubes.

94. (new) The method of claim 84 wherein the single-wall carbon nanotubes are predominantly of (n,n) type.

95. (new) The method of claim 84 wherein the single-wall carbon nanotubes are predominantly of (m,n) type, wherein m is not equal to n.

96. (new) A method for forming an array of single-wall carbon nanotubes comprising:

a) providing a plurality of single-wall carbon nanotubes;

b) providing a substrate to which a linking moiety will bind; and

c) binding the linking moiety to the substrate and onto at least one end of at least one single-wall carbon nanotube.

97. (new) The method of claim 96 wherein the plurality comprises single-wall carbon nanotubes having a homogeneous characteristic selected from the group, consisting of lengths, diameters, helicities and combinations thereof.

98. (new) The method of claim 96 wherein the plurality comprises single-wall carbon nanotubes in substantially parallel orientation, and wherein the substantially parallel orientated single-wall carbon nanotubes form a monolayer on the substrate.

99. (new) The method of claim 97 wherein the plurality comprises single-wall carbon nanotubes in substantially parallel orientation, and wherein the substantially parallel orientated single-wall carbon nanotubes form a monolayer on the substrate.

100. (new) The method of claim 96 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

101. (new) The method of claim 97 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

102. (new) The method of claim 98 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

103. (new) The method of claim 99 wherein the plurality comprises single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

104. (new) The method of claim 96 wherein the plurality comprises endohedrally-modified single-wall carbon nanotubes.

105. (new) The method of claim 96 wherein the substrate comprises a metal selected from the group consisting of gold, mercury and indium-tin-oxide.

106. (new) The method of claim 96 wherein the linking moiety comprises a moiety selected from the group consisting of -S-, -S-$(CH_2)_n$ -NH- and -$SiO_3(CH_2)_3NH$-.

107. (new) The method of claim 96 wherein the single-wall carbon nanotubes are predominantly of (n,n) type.

108. (new) The method of claim 96 wherein the single-wall carbon nanotubes are predominantly of (m,n) type, wherein m is not equal to n.

109. (new) A method of forming a patterned array of single-wall carbon nanotubes comprising:

a) masking a first portion of a substrate, wherein the substrate has a first unmasked portion;

b) binding a first plurality of single-wall carbon nanotubes to the first unmasked portion of the substrate using a first linking moiety;

c) removing the mask from the first portion of the substrate;

d) masking a second portion of the substrate, wherein the substrate has a second unmasked portion; and

e) binding a second plurality of single-wall carbon nanotubes to the second unmasked portion of the substrate using a moiety selected from the group consisting of the first linking moiety and a second linking moiety.

110. (new) The method of claim 109 where the first plurality is a predominately different type of single-wall carbon nanotubes from the second plurality.

111. (new) The method of claim 109 wherein:

a) the first plurality has a first homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof;

b) the second plurality has a second homogeneous characteristic selected from the group consisting of lengths, diameters, helicities; and combinations thereof; and

c) the first homogeneous characteristic is different than the second homogeneous characteristic.

112. (new) An array comprising single-wall carbon nanotubes aggregated in substantially parallel orientation.

113. (new) The array of claim 112 wherein the single-wall carbon nanotubes comprise a group of single-wall carbon nanotubes having a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof.

114. (new) The array of claim 112 wherein the single-wall carbon nanotubes form a monolayer extending in a direction substantially perpendicular to the orientation of the single-wall carbon nanotubes.

115. (new) The array of claim 113 wherein the single-wall carbon nanotubes form a monolayer extending in a direction substantially perpendicular to the orientation of the single-wall carbon nanotubes.

116. (new) The array of claim 112 wherein the single-wall carbon nanotubes have lengths in the range between about 5 and about 1000 nm.

117. (new) The array of claim 113 wherein the single-wall carbon nanotubes have lengths in the range between about 5 and about 1000 nm.

118. (new) The array of claim 114 wherein the single-wall carbon nanotubes have lengths in the range between about 5 and about 1000 nm.

119. (new) The array of claim 115 wherein the single-wall carbon nanotubes have lengths in the range between about 5 and about 1000 nm.

120. (new) The array of claim 112 comprising single-wall carbon nanotubes with at least one substituent bonded at at least one end of the single-wall carbon nanotubes.

121. (new) The array of claim 112 comprising endohedrally modified single-wall carbon nanotubes.

122. (new) The array of claim 112 wherein the single-wall carbon nanotubes are predominantly of (n,n) type.

123. (new) The array of claim 112 wherein the single-wall carbon nanotubes are predominantly of (m,n) type, wherein m is not equal to n.

124. (new) A substantially two-dimensional array comprising single-wall carbon nanotubes aggregated in substantially parallel orientation, wherein the single-wall carbon nanotubes are attached to a substrate.

125. (new) A substantially two-dimensional array comprising single-wall carbon nanotubes aggregated in substantially parallel orientation, wherein at least one substituent at at least one end of the single-wall carbon nanotubes interact chemically with a substrate.

126. (new) The array of claim 124 comprising single-wall carbon nanotubes having a homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof.

127. (new) The array of claim 124 comprising single-wall carbon nanotubes aggregated in substantially parallel orientation, wherein the substantially parallel oriented single-wall carbon nanotubes form a monolayer on the substrate.

128. (new) The array of claim 126 comprising single-wall nanotubes aggregated in substantially parallel orientation, wherein the substantially parallel oriented single-wall carbon nanotubes form a monolayer on the substrate.

129. (new) The array of claim 124 comprising single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

130. (new) The array of claim 126 comprising single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

131. (new) The array of claim 127 comprising single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

132. (new) The array of claim 128 comprising single-wall carbon nanotubes having lengths in the range between about 5 and about 1000 nm.

133. (new) The array of claim 124 comprising endohedrally modified single-wall carbon nanotubes.

134. (new) The array of claim 124 wherein the substrate comprises a metal selected from the group consisting of gold, mercury and indium-tin-oxide.

135. (new) The array of claim 125 wherein the substituent is a moiety selected from the group consisting of -S-, -S-$(CH_2)_n$ -NH- and -$SiO_3(CH_2)_3NH$-.

136. (new) The array of claim 124 wherein the single-wall carbon nanotubes are predominantly of (n,n) type.

137. (new) The array of claim 124 wherein the single-wall carbon nanotubes are predominantly of (m,n) type, wherein m is not equal to n.

138. (new) The array of made by the process of:

a) masking a first portion of a substrate, wherein the substrate has a first unmasked portion;

b) binding a first plurality of single-wall carbon nanotubes to the first unmasked portion of the substrate using a first linking moiety;

c) removing the mask from the first portion of the substrate;

d) masking a second portion of the substrate, wherein the substrate has a second unmasked portion; and

e) binding a second plurality of single-wall carbon nanotubes to the second unmasked portion of the substrate using a moiety selected from the group consisting of the first linking moiety and a second linking moiety.

139. (new) The array of claim 138 wherein the first plurality is a predominately different type of single-wall carbon nanotubes from the second plurality.

140. (new) The array of claim 138 further made wherein:

a) the first plurality has a first homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof;

b) the second plurality has a second homogeneous characteristic selected from the group consisting of lengths, diameters, helicities and combinations thereof; and

c) the first homogeneous characteristic is different than the second homogeneous characteristic.

* * * * *

REMARKS

1. *Status of the Application.* Claims 1-83 are cancelled herein without prejudice or disclaimer to the subject matter thereof. Claims 84-140 are added herein. No new matter is added by the addition of these claims.

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It is believed that each of the claims now pending in the present application recites elements neither taught nor suggested by the prior art. Further, it is believed that the application as a whole is in proper form and condition for allowance. If the Examiner believes that the application may be placed in even better condition for allowance, he or she is invited to contact the undersigned at the telephone number noted below. Alternatively, or in addition, if the Examiner believes that an Examiner interview would be beneficial, the Examiner is invited to note that the undersigned has ready access to the videoconferencing facilities of the South Central Intellectual Property Partnership at Rice University in Houston, Texas. The inventors and the undersigned would welcome the opportunity to use those facilities to clarify any issues deemed to remain unresolved.

Respectfully submitted,

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